

INTERPRETATION AND ANALYSIS OF PHOTOGRAPHY COVERING THE ABERFAN AREA

Carried out by

FAIREY SURVEYS LIMITED

On behalf of

THE NATIONAL COAL BOARD

1. Introduction

This photographic interpretation and analysis of the Aberfan area has been concerned with all of the photography listed below in Para. 4 which covers the period 1945-1965. The object of this analysis was to answer the questions given in Para. 2 and also to interpret any further information regarding the area which could be obtained from the photography and which might be relevant.

In this report the same illustrations have been used as in the report prepared for the Aberfan Tribunal by the Joint Air Reconnaissance Intelligence Centre (U.K.). In preparing overlays to each of the illustrations the JARIC numbering system has been followed to allow an easy comparison of the two reports. For the additional notes given in this report the numbering has been started at No. 101 to avoid confusion.

For each illustration there is an overlay and a list of related notes. It is possible to place most of the overlays over any of the illustrations but, due to variations in camera position and elevation, some prints present a very much more oblique view of the area than others. Because of this, not all overlays are interchangeable.

2. Requirement

This was to answer four questions posed by the Aberfan Tribunal.

- Question 1.** What evidence is there of tipping between Tips 3 and 4 before 1958?
- Question 2.** What features, i.e. drainage, hollows, etc., can be identified in the tongue of land which is between the toes of Tips 1, 2 and 3 and the collapsed spoil from Tip 4 prior to 1963?
- Question 3.** What collapses occurred on Tip 7 from 1958 to September 1963?
- Question 4.** Describe the movements of Tip 7 from 14 September 1963 to 3 June 1965?

3. Measurement

In posing the questions, measurements of features on the photography were not called for and have not been given. No ground control or accurate rectification has been carried out for the nine figures illustrating this report and because of distortions which can occur in the photography due to low flying heights relative to ground height variations, these illustrations should not be used for scaling distances.

4. Illustrations

- Fig. 1. Enlarged vertical print of spoil area with annotated overlay.
Frame 5100 from 3G/TUD/T19 Pt 2.
- Fig. 2. Enlarged vertical print of spoil area with annotated overlay.
Frame 3199 from CPE (UK) 58/RAF/1997.

- Fig. 3. Enlarged vertical print of spoil area with annotated overlay.
Frame 3412 from 58/RAF/676.
- Fig. 4. Enlarged vertical print of spoil area with annotated overlay.
Frame 3007 from 540/RAF/621.
- Fig. 5. Enlarged vertical print of spoil area with annotated overlay.
Frame 0137 from 58/RAF/3506.
- Fig. 6. Enlarged vertical print of spoil area with annotated overlay.
Frame 98 from OS/63/74 RAF.
- Fig. 7. Reduced vertical print of spoil area with annotated overlay.
Frame 081 from F.S.L. ABERFAN AREA.
- Fig. 8. Reduced vertical print of spoil area Tip 7 with annotated overlay.
Frame 0186 from H.S.L. 279, RUN 5.
- Fig. 9. Reduced vertical print of spoil area Tip 7 with annotated overlay.
Frame 1242 from H.S.L. 366.

- (1) Tip No. 5. Tipping is in progress on this tip.
 - (2) Buildings.
 - (3) Tip No. 4. Tipping no longer in progress. Partly overlies area of earlier tipping (see Note 5).
 - (4) Fault line of collapse of Tip 4.
 - (5) Area of old tipping between Tips 3 and 4. This area has a similar appearance to Tip 1.
 - (6) Tip No. 3.
 - (7) Tip No. 2.
 - (8) Tip No. 1.
 - (9) Stream 'b'. Source not apparent due to scale of photography.
 - (10) Stream 'c'. Source not apparent due to scale of photography.
 - (11) School.
 - (12) Farm building.
 - (13) Outline of collapsed material from Tip No. 4. Note that hatching indicates bulk of this material which still lies in the top section of the slide. The lower section (dot stipple) has no great depth of material in it, though its length is considerable.
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- (101) Material at lower level protruding southwards from foot of Tip 2 at point of contact with Tip 1.
 - (102) Watercourse (stream 'a').
 - (103) Possible ditch.
 - (104) Watercourse below Tip 1.
 - (105) Bank and/or ditch across slope below slide from Tip 4.
 - (106) 'Bulge' in ground between streams 'b' and 'c'.
 - (107) Watercourse (stream 'd').
 - (108) Estimated outline of southern base of Tip 4 prior to slide.
 - (109) Newly cut ditches draining site of Tip 5. These ditches would tend to prevent surface water from accumulating above slide from Tip 4.
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General Comment

This photography, though excellent within the limitations of its scale, does not permit detailed examination of drainage features. Heavy growth of ferns and leaves on trees makes minor ground detail indistinct or invisible.

- (14) Tipping still in progress on Tip 5. Now covers extended area.
 - (15) Outline of collapsed material from Tip 4—apparently unchanged.
 - (16) Area of old tipping (see Note 5—Fig. 1).
 - (17) Open area—no depression is apparent.
 - (17a) Probable footpath—connects with footpath on Tips 1 and 2.
 - (18) Stream 'b'. White patches may be evidence of 'scouring', indicating that water is, or has been, fast flowing. It is not certain that this stream contained water at time of photography. This stream can be traced uphill to the edge of the area of old tipping (Note 101 Fig. 1). It is not possible to say whether it starts here or whether, at one time, the bed extended further uphill.
 - (19) Stream 'c'. This stream is clearly defined downhill from the edge of the material from Tip 4. A drainage channel, possibly the original bed of stream 'c', runs through the material from Tip 4. No water is visible.
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- (110) Ditches in tongue of land between slide from Tip 4 and Tips 1, 2 and 3.
 - (111) Apparently marshy area with drainage channels (possibly artificial) running into stream 'b'.
 - (112) Ditch and bank confirmed (see Notes 103 and 105 Fig. 1).
 - (113) Probable emergence of water and watercourse.
 - (114) Fence, across lower end of Tip 4 material.
 - (115) Minor watercourse. Trees obscure any bed.
 - (116) Fence along South side of material from Tip 4.
 - (117) Slight 'bulge' between streams 'b' and 'c'.
 - (118) Depression channels. May be dry watercourses.
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General Comment

A better appreciation of the upper reaches of the streams is possible from this photography confirming their drainage patterns. It seems probable that the upper ditch (Note 109, Fig. 1) drains into stream 'd'. Detail on the lower tips is indistinct on this photography.

- (20) Tipping still in progress on Tip 5.
 - (21) Collapsed material from Tip 4 apparently unchanged.
 - (22) Area of old tipping (see Note 5 Fig. 1).
 - (23) Open area (see Note 17 Fig. 2).
 - (24) Stream 'b' and ditches.
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- (119) Confirmed as area of earlier tipping.
 - (120) Fence.
 - (121) Tip 5 has increased in size but has also changed its conical shape. It now appears to be bulging at the base on the South side.

Key to Annotations (Fig. 4)**Photography 12th OCTOBER 1951**

- (25) Tipping still in progress on Tip 5
 - (26) Extent of material from Tip 4 apparently unchanged
 - (27) Area of earlier tipping
 - (28) Streams partially obscured by vegetation
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General Comment

Very poor quality photography. Long shadows obscure much ground detail.

- (29) Tip 5. Now abandoned. Note that bulging is now more apparent and has distorted the outline of the tip.
 - (30) Tip 6. Built and abandoned since October 1951.
 - (31) Tipping in progress on Tip 7. Area of earlier tipping (see Note 5 Fig. 1) has been covered. Tipping has also encroached on Tip 4. There is no apparent change in the extent of Tip 4.
 - (32) Open area. (See Note 17 Fig. 2).
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- (123) Levelling work has been carried out between Tips 4 and 7.
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General Comment

This photography is so poor that it is of little value for detailed interpretation.

- (33) Minor displacement of material down East side of Tip 7 which has come to rest against Tip 3.
- (34) Black lines show tipping of wet semi-liquid material which has flowed in channels. This material is being tipped down the East side of Tip 7 and, moving round the Southern base of Tip 3, has reached the area of older tipping lying at the foot of Tips 1 and 2, tipping this wet material has had the effect of creating a new tip area as it no longer comes to rest on the slopes of Tip 7 itself.
- (35) Excavation and levelling operations at the Eastern end of Tip 1. Vehicle track extends across stream 'b'.
- (35A) Possible vehicles.
- (36) Stream 'b'.
- (37) Stream 'c'. The small scale of photography prevents interpretation of this stream any higher uphill.
- (38) Collapsed material from Tip 7.
- (39) Fault line of collapse on Tip 7.
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- (124) Area of levelling between Tips 4 and 7. This has been considerably extended since April 1960.
- (125) Vehicle tracks on material of Tip 4.
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General Comment

Very good photography within limitations of scale.

- (40) Area levelled between Tips 4 and 7. This area seems to be the same as in the May 1963 photography.
- (41) Wet semi-liquid material still being tipped over the East side of Tip 7. As in the May 1963 photography, some of this wet material has flowed along a channel around the bases of Tips 2 and 3. At the time of the present photography the main channel is an offshoot flowing South of the channel already mentioned. At this date no appreciable build up of this wet material has occurred except against the flank of Tip 3 (see Note 131).
- (42) Small accumulation of material from side of Tip 7 (see Note 33 Fig. 6).
- (43) Dark streak which is probably the remains of an earlier channel of wet material.
- (44) No comment. See notes on JARIC report.
- (45) Collapsed material from Tip 7 (see Note 38 Fig. 6).
- (46) Area of old tipping (see Note 101 Fig. 1).
- (47) Stream 'b'.
- (48) Area of levelling (see Note 35 Fig. 6).
- (49) Soering of vehicle track (see Note 35 Fig. 6).
- (50) Stream 'c'. Water is now running into this stream from the Southern spur of wet tipping (see Note 41 above).
- (51) Material of old collapse on Tip 4.
- (52) Fault planes on Tip 7 (see Note 39 Fig. 6).
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- (129) Emergence of water confirmed (see Note 113 Fig. 2). The surface water forms a well defined course just above the ditch into which it runs (see Note 103 Fig. 1).
- (130) Cross hatched area indicates the extent of the spread of wet material from Tip 7. At the time of photography this appears as little more than a shallow surface covering.
- (131) Very slight depression at the foot of the fault plane on Tip 7.
- (132) Tracks across Tip 4—now more pronounced than on Fig. 6.
- (133) Possible minor water channel.
- (134) Tipping trucks.
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General Comment

Excellent photography. Tip detail is very clear.

- (53) Main channel for tipping wet material. Some scouring has occurred on the S.E. side of Tip 7 due to this wet tipping. It appears that wet tipping might have recently ceased. The wet channel at the top of the tip has disappeared and some dry tipping has taken place at the top of the tip on the South side.
- (54) Vehicle track (see Note 35 Fig. 6).
- (55) Extent of tipping material from Tip 7
- (56) Minor run of wet tipped material through fence into field on South side of original Tip 4 material. Note that material from Tip 4 is now cut by the overlying deposit of Tip 7 wet tipping.
- (57) The steep lower edge at the furthest downhill extent of the Tip 7 material and also the marked build-up of material at one point within the area seems to indicate that slides or collapses have occurred within the tipping area. Due to the wet nature of the material fault lines are very indistinct.
- (58) Old material from Tip 4.
- (59) Area of material from earlier collapse on Tip 7 (see Note 38 Fig. 6).
- (60) Very slight depression (see Note 131 Fig. 7). This depression has been accentuated by wet material flowing into and around it on the North side (138).
- (61) Further fault line running from the edge of the earlier fault towards the top of the tip. It appears that the material to the North of this fault line must have settled.
- (62) Small displacement of material from just below tip head with dark streak of displaced material.
- (63) Larger debris now litters the lower slopes of Tip 7 leaving the upper slopes with a bare appearance.
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- (137) Further increase in deposit of material from Tip 7.
- (138) See Note 60 above.
- (139) Area covered by wet tipped material from Tip 7. At least 18 separate channels can be identified in this area—indicating that as the material has built up, new flow lines have been established.
- (140) Surface water channel through tipped material running into stream 'b'.
- (141) Area of old tipping.
- (142) Material from Tip 7 overlaying Tip 4. This appears to have come from the side of Tip 7 and also to have been washed down from the gully between the two tips.
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General Comment

Excellent photography. Ideal for examination of Tip 7.

- (64) Tip 7.
 - (65) Fault plane at extreme end of Tip 7 caused by slight subsidence. The ends of the three sets of rails at the tiphead are now unsupported.
 - (66) Area of dry material tipped since November 1964. This new material extends to just above the new fault line noted at 61 Fig. 8.
 - (67) Area of earlier fault on Tip 7. No significant change seems to have occurred, although changed perspective makes comparison difficult.
 - (68) Two old wet tipping channels on Tip 7. The Southern branch 68A containing some water. The Northern channel 68B appears dry although old narrow water channels can be seen. There is a further channel containing some water (68C) between the two main channels.
 - (69) Main drainage channel cut diagonally across the slope of the area of wet tipping from Tip 7. This ditch drains towards stream 'b'. The steepness of the sides of the ditch indicate that the tipped material is fairly firm and dry. The bottom of the ditch appears wet but there is no indication of any large run off of water. A slight channel occurs at the approach to stream 'b'.
 - (70) Head of stream 'b'.
 - (71) Old channel (see Note 140 Fig. 8) draining into tributary of stream 'b'.
 - (72) Rail bridge.
 - (73) Ditch which collects emergent water (see Note 113 Fig. 2).
 - (74) Stream 'c'.
 - (75) Material from old collapse of Tip 4.
 - (76) Fence (see Note 114 Fig. 2).
 - (77) Bulldozer excavators. Second main drain running towards stream 'b'.
 - (78) Area cleared of the tipped material noted in November 1964 (see Note 56 Fig. 8).
 - (79) Southern limit of material from Tip 7.
 - (80) Slight depression (see Note 60 Fig. 8) now less pronounced. Material in front of the depression has moved downhill and has flattened out. There is a natural drainage channel running from the centre of the depression which is occupied by two trucks which are standing in the same position as on the November 1964 photography.
 - (81) Material from old collapse of Tip 4.
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- (143) Tipping of wet material is no longer in progress.
 - (144) Part of area of old tipping still visible (see Note 101 Fig. 1).
 - (145) Previously steep edge of spoil has now been graded.
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General Comment

Excellent photography.

Question 1

What evidence is there of tipping between Tips 3 and 4 before 1958?

Answer to Question 1

On all photography up to and including that of 12 October 1951, it is possible to identify an area of old tipping between Tips 3 and 4. In appearance this site was very similar to Tip 1. This area is indicated on the overlays as follows:—

Fig. 1	—	Note 5
Fig. 2	—	Note 6
Fig. 3	—	Note 22
Fig. 4	—	Note 27

Both Tips 3 and 4 appear to partially overlay this area of old tipping at its Western and Eastern sides respectively. The tip in question is markedly lower than both Tips 3 and 4, its foot appears to have been partly covered by some of the deposit from the collapse of Tip 4. The photography of 21 April 1960 shows that the new Tip 7 had then completely covered this area.

Question 2

What features, i.e. drainage, hollows, etc., can be identified in the tongue of land which is between the toes of Tips 1, 2 and 3 and the collapsed spoil from Tip 4 prior to 1963?

Answer to Question 2

1. Features which can be positively identified in the tongue of land between Tips 1, 2 and 3 and the collapsed spoil from Tip 4, are as follows:—
 - (i) **Drainage**
Fig. 2 Note 110. A pattern of ditches and natural water channels draining into stream 'b'. Some of these channels have been interpreted as ditches because of their straight artificial appearance. Varying scales and quality of photography make this drainage pattern difficult to interpret but over the range of photography, some of the channels seem well established although on overlays to later photography they have not been itemised. By September 1963 wet tipped material from Tip 7 had reached the upper limits of this drainage pattern.
 - (ii) **Old tip site**
Fig. 1 Note 101. This area is also noted on some of the overlays to later photography.
 - (iii) Fig. 2 Note 117. A slight bulge in the ground separating the drainage areas of stream 'b' and stream 'c'.
 - (iv) Fig. 2 Note 114. Fence.
2. In addition to the features which can be positively identified, the following points have been noted:—
 - (i) Note 17a Fig. 2. A probable footpath crossing the tongue of land from the base of Tip 1 to the collapsed material of Tip 4 opposite Tip 3.
 - (ii) Note 113 Fig. 2. Possible emerging water. (This was confirmed later at Note 129 Fig. 7).
3. So far as can be seen from the photography there are no depressions or hollows in this area of land.

Question 3

What collapses occurred on Tip 7 from 1958 to September 1963 ?

Answer to Question 3

1. Photography of 21 April 1960 gives no indication of any collapses on Tip 7.
2. Photography of 31 May 1963 indicates :—
 - (i) Note 33 Fig. 6. A small amount of material lying between Tip 7 and Tip 3. This material does not appear to be the result of a collapse but rather the accumulation of loose material from the tip head.
 - (ii) Note 38 Fig. 6. A collapse of material from Tip 7. (The fault line for this collapse is indicated by Note 39 Fig. 6). It is not possible to say when this collapse occurred.
 - (iii) At the time of photography the nature of the tipping seems to have changed and wet tipping is in progress. Wet tipped material has reached the area of old tipping at the foot of Tips 1 and 2.
3. Photography of 14 September 1963 gives no indication of any further collapses on Tip 7. There has been a slight increase in the amount of material lying between Tip 7 and Tip 3.